



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,401	03/01/2004	Ming Li	MATG-401US	1061
23122	7590	03/07/2006	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			ELVE, MARIA ALEXANDRA	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/790,401

Applicant(s)

LI ET AL.

Examiner

M. Alexandra Elve

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-85 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 and 25-85 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/15/05, 3/1/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of claims 13-24 in the reply filed on 1/17/06 is acknowledged.

Claims 1-12 & 25-85 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/17/06.

### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13-18 & 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (Optics Communications, 2002).

Li et al. discloses producing small features (nanometer -submicron) on a submicron level device. Micromachining (direct writing) is conducted using ultrafast lasers. Optical illumination and laser ablation is used. The illumination wavelength is about 500 nm and a positioning accuracy of 60nm is required. Digital imaging techniques enhance the optical resolution to a subwavelength domain. A digital camera may have pixels of about 6.7 nm. Each pixel corresponds to about a 50 x 50 nm square on the optical device (waveguide). The diffraction limit is dealt with by drilling additional holes in the waveguide (in the same vicinity). Both the waveguide and small-drilled holes are affected by blurring causing optical resolution difficulties. Since both are blurred by the same imaging system, calibration of distance yields an absolute scale

and alignment accuracy is no longer limited by the wavelength. In absolute terms the level of inaccuracy is no more than 100nm, well below the illumination wavelength of 500 nm. In other words, accuracy is about 1/10 of the illumination light wavelength and meets the 600 nm requirements for waveguide fabrication.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. as applied to claims 13-18 & 21-24 above, and further in view of Fauver et al. (USPN 6,856,712).

Li et al. (Optics “) discloses a method for the fabrication of an optical device, that is, waveguide, but does not teach the use/presence of a coating.

Fauver et al. discloses the micro-fabrication of an optical waveguide. Waveguide etching may be varied by an applied coating. The coating(s) maybe be graded or of a predetermined pattern, for example a layer of photoresist that has been exposed differentially to polymerization. The method of micro-fabrication of optical waveguides can include various coatings of metals, metal compounds, dielectric compounds, dyes, pigments, polymers, liquid crystals and/or scattering materials. (col. 21, lines 30-55)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a coating as taught by Fauver et al. in the Li et al. (Optics ") process because this is merely a way of creating different types of drilling depths.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (Optics ") as applied to claims 13-18 & 21-24 above, and further in view of Li et al. (USPN 6,951,627).

Li et al. (Optics ") discloses a method for the fabrication of an optical device, but does not teach the use of a mask.

Li et al. ('627) discloses a method of drilling holes using a precision laser micromachining process. The system directs the laser beam through a moveable mask aperture creating a sub beam that is reduced in size by a lens system as it is imaged onto a workpiece. The drilled feature size is less than or equal to the wavelength of the drilling laser beam. Additionally, the throughput is increased by using a multiple aperture mask (essentially a pinhole mask), which creates sub-beams for parallel processing. (abstract, col. 2, lines 55-67)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a mask, as taught by Li et al. ('627) in the Li et al. (Optics ") process because this would optimize manufacturing efficiency.

***Conclusion***

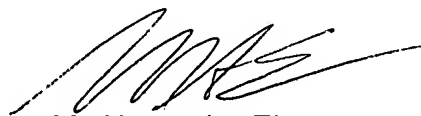
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 5, 2006.

  
M. Alexandra Elve  
Primary Examiner 1725